[redacted]

datum inc.

Timing Instrumentation

MASTER COPY

INSTRUCTION MANUAL
MODEL 9610
TIMING TERMINAL UNIT
PART NUMBER 9610-798

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SECTION I
DESCRIPTION

The Model 9610-798 Timing Terminal Unit consists of one (1) each Models 9610-141 chassis and Model 9610-165 Power Supply, and twelve (12) Model 9610-2013 Dual H.F. Distribution Amplifiers.

The top assembly drawing in Section V shows the locations of these plug-in functional modules, and the input/output connectors. See Wiring Diagram 9610-8132 for input/output connections.

Signal input and output connections are made via BNC connectors mounted on the instrument's rear panel.

9610-141 CHASSIS

GENERAL DESCRIPTION

The Model 9610-141 Chassis is a housing assembly of the DATUM, Inc. Model 9610 Timing Terminal Unit System. The various module mounting needs, power interconnection, and input/output signal connection capability are provided via wiring between the several module connectors provided in the chassis.

Up to 14 single-width modules (or up to 7 double-width modules) or any appropriate combination of widths may be accommodated in a single Model 9610-141 Chassis. Seven module connectors are supplied in the basic configuration.

Signal input/output connections are made via BNC connections mounted on the instrument's rear panel. Twelve (12) input and twenty-four (24) output connections are provided in the basic configuration. Refer to Wiring Diagram (see Top Assembly drawing) for specific input/output configuration.

Primary power is accepted via the three pin connector which mates with the supplied power cord.

The Model 9610-141 Chassis is 3-1/2 inches high, 10 inches deep and 17 inches wide, equipped with mounting ears for installation in a standard 19-inch equipment cabinet.

MODEL 9610-165 POWER SUPPLY
(P/N 18733)

GENERAL DESCRIPTION

The Model 9610-165 Power Supply is a double-width, (H-3.28" X W-2.30"), functional module of the DATUM, Inc. Model 9610-XXX Timing Terminal Unit System that provides power for the other modules in the system.

The Model 9610-165 Power Supply provides the following power outputs:

1. +5 volts at 1 ampere
2. +8 volts at 1 ampere
3. -8 volts at 1 ampere

SPECIFICATIONS

1. Power
   a. Input

      115V 10%/220V 10% 50 to 400 Hz, 30 watts

      Line voltage taps of 5% are provided for nominal line voltages of:

      110 volts - connect E2 to E8
      115 volts - connect E2 to E9 E5 to E7
      120 volts - connect E2 to E10

      210 volts - connect E2 to E8
      220 volts - connect E2 to E9 E5 to E6
      230 volts - connect E2 to E10

b. Output, Full Load

Voltage	Current
+8 volts ±5%	1.0 amperes
-8 volts ±5%	1.0 amperes
+5 volts ±5%	1.0 amperes

Each regulated voltage is over-current protected.

Pin configuration is as follows:

1.	+5 volts power	A.	+5 volts power
2.	+5 volts return	B.	+5 volts return
3.	+8 volts return	C.	+8 volts return
4.	Not Used	D.	Not Used
5.	+8 volt power	E.	+8 volt power
6.	-8 volt return	F.	-8 volt return
7.	-8 volt power	H.	-8 volt return
8.	AC power neutral	J.	AC power neutral
9.	AC line (high side)	K.	AC line (high side)
10.	AC line (low side)	L.	AC line (low side)

2. Mechanical: Front Panel: H-3.23" X W-2.30"
Connector: 20 pin, edge of card plated
Mounting: Front panel thumbscrews
Depth: 6.8 inches after mounting

H.F. DISTRIBUTION AMPLIFIER
MODEL 9610-2013
Assembly No. 18712

GENERAL DESCRIPTION

The Model 9610-2013 H.F. Distribution Amplifier is a functional module of the DATUM, Inc. Model 9610 Timing Terminal Unit system. Power and input/output connections are provided by the Model 9610-140 series chassis and Model 9610-150 series power supply assemblies which are integral components of the 9610 system.

The Model 9610-2013 H.F. Distribution Amplifier may be installed in any appropriate module connector of the Model 9610-140 series chassis to provide two (2) independent, isolated AC amplifier functions.

The Model 9610-2013 is provided with output loss alerting (alarm buss activation and visual LED indication), along with a means to test and to reset the alarms. In most cases, this feature is disabled at the factory prior to shipping by providing a constant reset (ground) to the alarm circuitry in the chassis wiring. This feature may be enabled by removing the ground from the reset pin and providing an external means of testing and resetting the alarms (Refer to input specifications).

SPECIFICATIONS

1. Power Requirement (Nominal)
   a. Positive supply voltage (+6 to +15 volts) at 40 milliamperes (excluding load)
   b. Negative supply voltage (-6 to -15 volts) at 40 milliamperes (excluding load)
   c. +5 volts at 60 milliamperes
2. Inputs
   a. Typical input signal: IRIG G Time Code
      1) Carrier frequency: 100 kHz
      2) Modulation Rate: 10 KPPS

b. Input Configuration: Single-ended

c. Input Impedance: 5 kilohms to ground

d. Input Levels: 0.5 to 7 volts, peak-to-peak

e. Frequency Response: ±3dB from 30kHz to 300 kHz

f. Alarm Test

Momentary closure to ground

g. Alarm Reset

A momentary closure to ground will reset the alarm buss and indication. If a fault still exists, the fault indication will reappear upon removal of the closure to ground.

NOTE: The input signal type referenced above is for reference only. Any AC signal meeting the general specifications may be used.

3. Outputs

a. Each output line is fuse-protected against high voltage damage to circuitry.

b. Output level: Adjustable from 0 to approx. 10 volts, peak-to-peak.

c. Source impedance: Approximately 50 ohms, balanced, line-to-line, transformer-coupled.

d. Alarm Buss: Diode OR'ed, low-active buss.

4. Pin Configuration

1.	Input A	A.	Input A (Return)
2.	+5 Volts	B.	+5 Volts
3.	Alarm Test	C.	Not Used
4.	Output A	D.	Output A
5.	Positive Supply Voltage	E.	Positive Supply Voltage
6.	Alarm Reset	F.	Alarm Buss
7.	Input B	H.	Input B (Return)
8.	Power Ground	J.	Power Ground
9.	Negative Supply Voltage	K.	Negative Supply Voltage
10.	Output B	L.	Output B

SECTION II
THEORY OF OPERATION

The theories of operation as enumerated in the Table of Contents can be found on the following pages.

MODEL 9610-165 POWER SUPPLY
(P/N 18733)

THEORY OF OPERATION

The Power Supply consists of three similar bridge rectifiers, filters and regulator circuits provideing ±8 volts (CRS1, C1-C4, A1 and A2) and +5 volts (CRS2, C5, C6 and A3) power outputs.

Each bridge rectifier output is filtered by capacitors sized for the maximum regulated current output of the respective supply. Each integrated circuit regulator output voltage is determined by the regulator type used. The regualtors are overcurrent and short circuit protected.

The AC power input is fused and bypassed to the power neutral in the Model 9610-140 Chassis. The power switch and indicator lamp are mounted on the front panel of the power supply.

INTERNAL ADJUSTMENTS

There are no Internal Adjustments arequired.

H.F. DISTRIBUTION AMPLIFIER
MODEL 9610-2013
Assembly No. 18712

THEORY OF OPERATION

The H.F. Distribution Amplifier consists of two identical AC amplifiers on a single circuit card. Each input is routed to an integrated circuit operational amplifier which is transformer-coupled (T1, T2) to the output. An adjustment potentiometer (R1, R10), mounted on the front panel, provides an adjustable overall gain of from 0 to approximately 4 (unloaded).

The amplifier's output is routed to a self-latching level-alarm circuit to provide visual indication of failure and to activate an alarm buss. The alarm circuit is comprised of an adjustable preset level comparator (A2, A5) which converts excursions of the amplifier output to TTL-level pulses. These pulses are used as clocks to an activity sensor comprised of a one-shot multivibrator set to approximately 15 milliseconds (1.5 times the period of the pulse rate of the IRIG A time code). If the peak level of the amplifier output falls below the DC level set by R6 (Channel A) or R15 (Channel B), the activity sensor "times out" and sets an R-S latch comprised of 1/2 of A6, illuminating the associated L.E.D. indicator and activating a diode-OR'ed alarm buss. The R-S latch may be reset by supplying a momentary closure to ground on pin 6 of the circuit card. Each output is fused. Diodes CR1/CR2 and CR7/CR8 protect the amplifier's output by limiting signal excursions to approximately ten volts. The amplifier's response is ±3dB from 30kHz to 300kHz.

INTERNAL ADJUSTMENTS

Alarm adjustment potentiometers R6 (Channel A), R15 (Channel B) determine the minimum acceptable output signal level. Use an oscilloscope to monitor the DC level at A2, pin 4 (Channel A) or at A5, pin 4 (Channel B). Adjust R6 or R15 to set this DC level to a value corresponding to the peak level determined above. When the output falls below this level, the alarm will be activated.

SECTION III
MAINTENANCE AND TROUBLESHOOTING

GENERAL

The Model 9610 Timing Terminal Unit System requires no routine electronic maintenance. The following instructions are intended to be a guide in the event of a system malfunction and to isolate the malfunction to a plug-in module. Adjustments should not be made unless there is an established malfunction attributable to mis-adjustment. Once the malfunctioning module has been detertmined, failed components may be found with standard troubleshooting techniques.

MALFUNCTION ISOLATION INSTRUCTIONS

1. Verify that all fuses are good and are seated firmly in their sockets.

2. Verify that all power inputs are within the specifications as defined in Section I.

3. Verify that input signals are within their specified limits as defined in Section I.

4. If under the above conditions the module does not meed its output specifications, the module has malfunctioned.

SECTION IV
RECOMMENDED SPARE PARTS

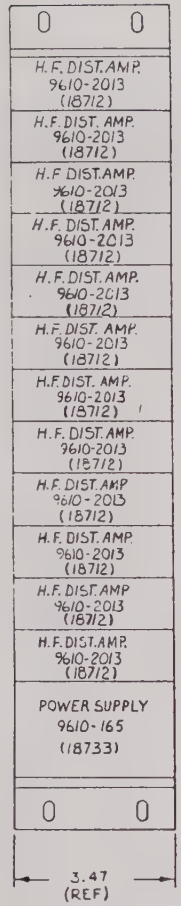
In order to insure continuous on-line operation with minimum down time for maintenance, it is recommended that spares be maintained at the module level rather than the component level at the using activity site.

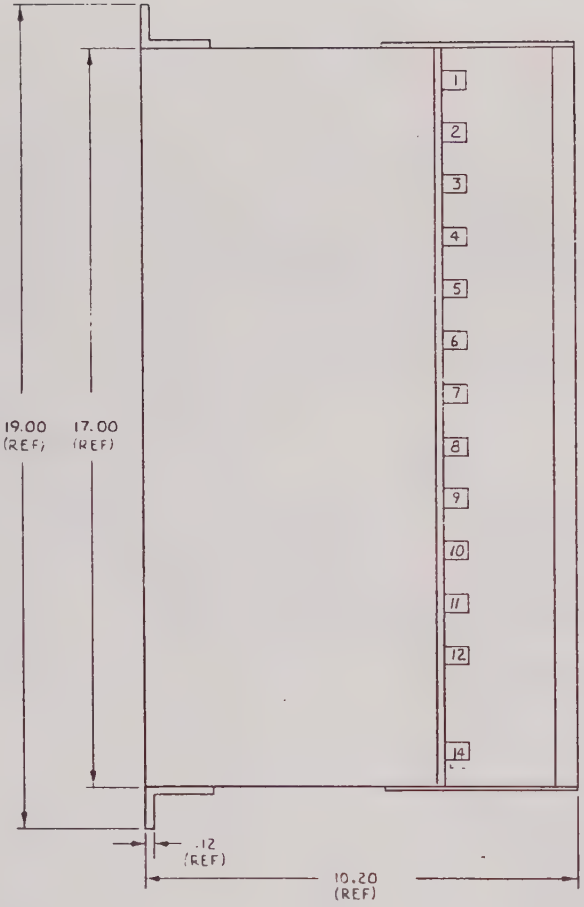
It is recommended that 10% of the modules used or a minimum of one (1) module of each type used (which ever is greater) be maintained at the using activity site.

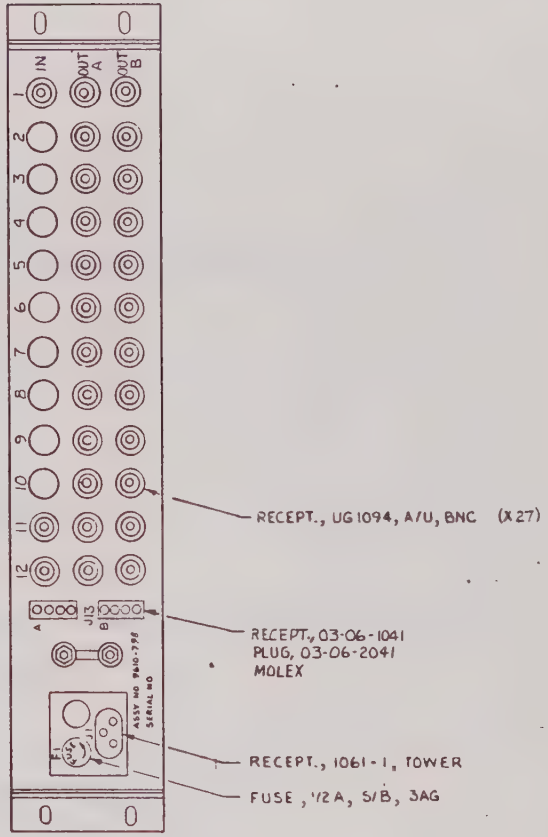
The module types and quantities utilized in the system may be determined from the Top Assembly Drawing in Section V of this instruction manual.

SECTION V
DRAWINGS

The Drawings enumerated in the Table of Contents can be found on the following pages.







2. J1 AC POWER INPUT
1. WIRING DIA 9610-8132

NOTES: UNLESS OTHERWISE SPECIFIED

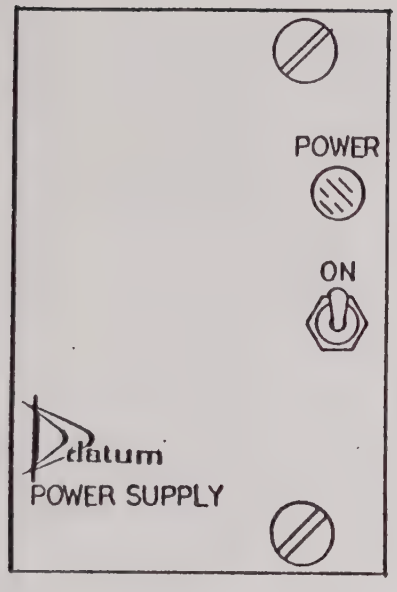
THIS DATA IS CONFIDENTIAL TO DATUM INC. AND SHALL NOT BE REPRODUCED OR USED FOR ANY PURPOSE EXCEPT TO THE EXTENT PROVIDED BY CONTRACT.

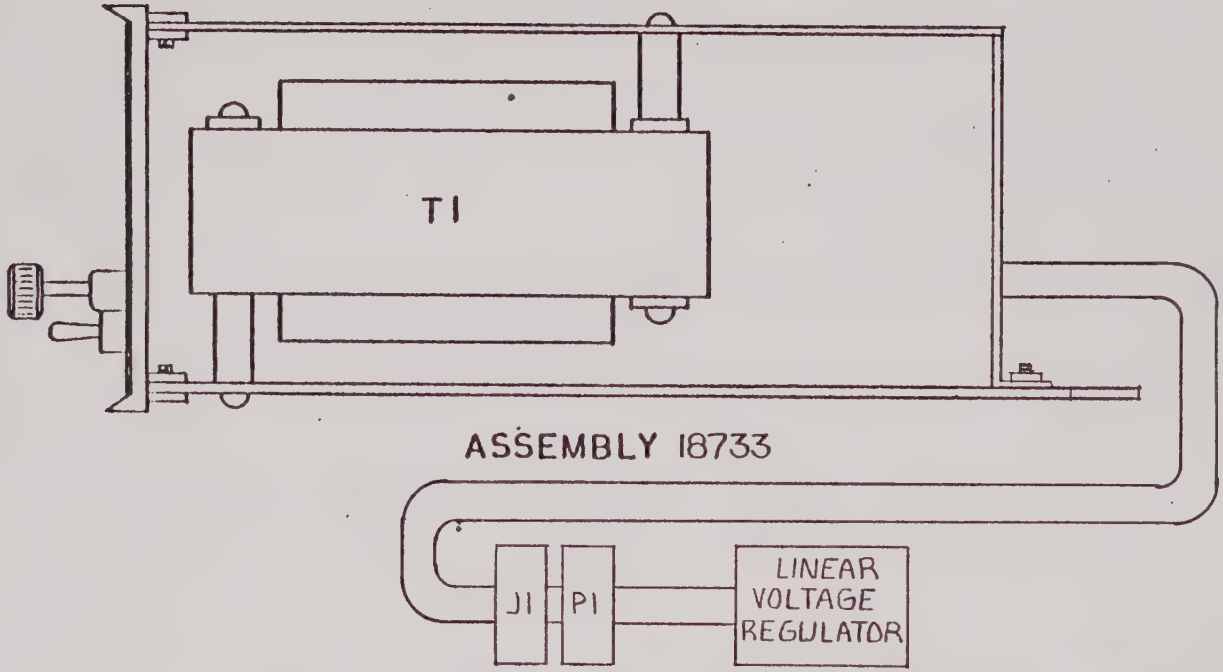
TITLE: TIMING TERMINAL UNIT

datum inc.
1363 S. STATE COLLEGE BLVD
ANAHEIM, CALIFORNIA 92806

DWN ED VALDEZ 11/2/64 | DES. 11/5/64 | CHK | ENGR 11/20/64 | SCALE NONE | FSC 31160 | SIZE C | 9610-798 | SHT 1 OF 1 | REV

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED





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OR USED FOR ANY PURPOSE EXCEPT TO THE EXTENT PROVIDED BY CONTRACT.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOL: .XX ± .03
.XXX ± .010
ANGLES ± 1/2°

TITLE
POWER SUPPLY

DWN	TERI	5/3/83	DES		
CHK			ENGR	W	1/83
SCALE	NONE		FSC	31160	

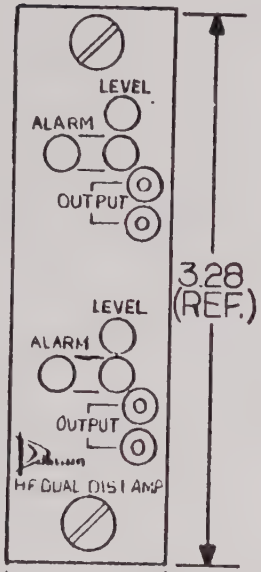
datum inc.
1363 S. STATE COLLEGE BLVD.
ANAHEIM, CALIFORNIA 92806

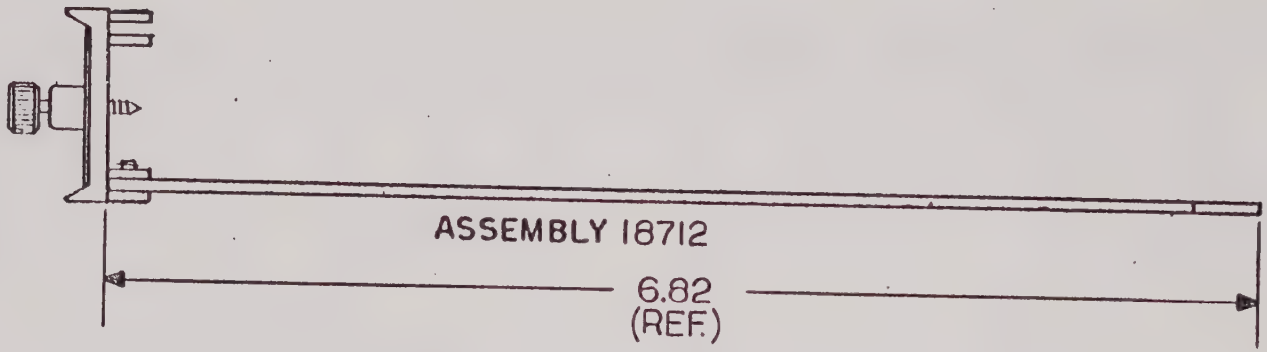
SIZE	DWG NO	REV
A	9610-165	

SHT | OF

NOTES: UNLESS OTHERWISE SPECIFIED

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED





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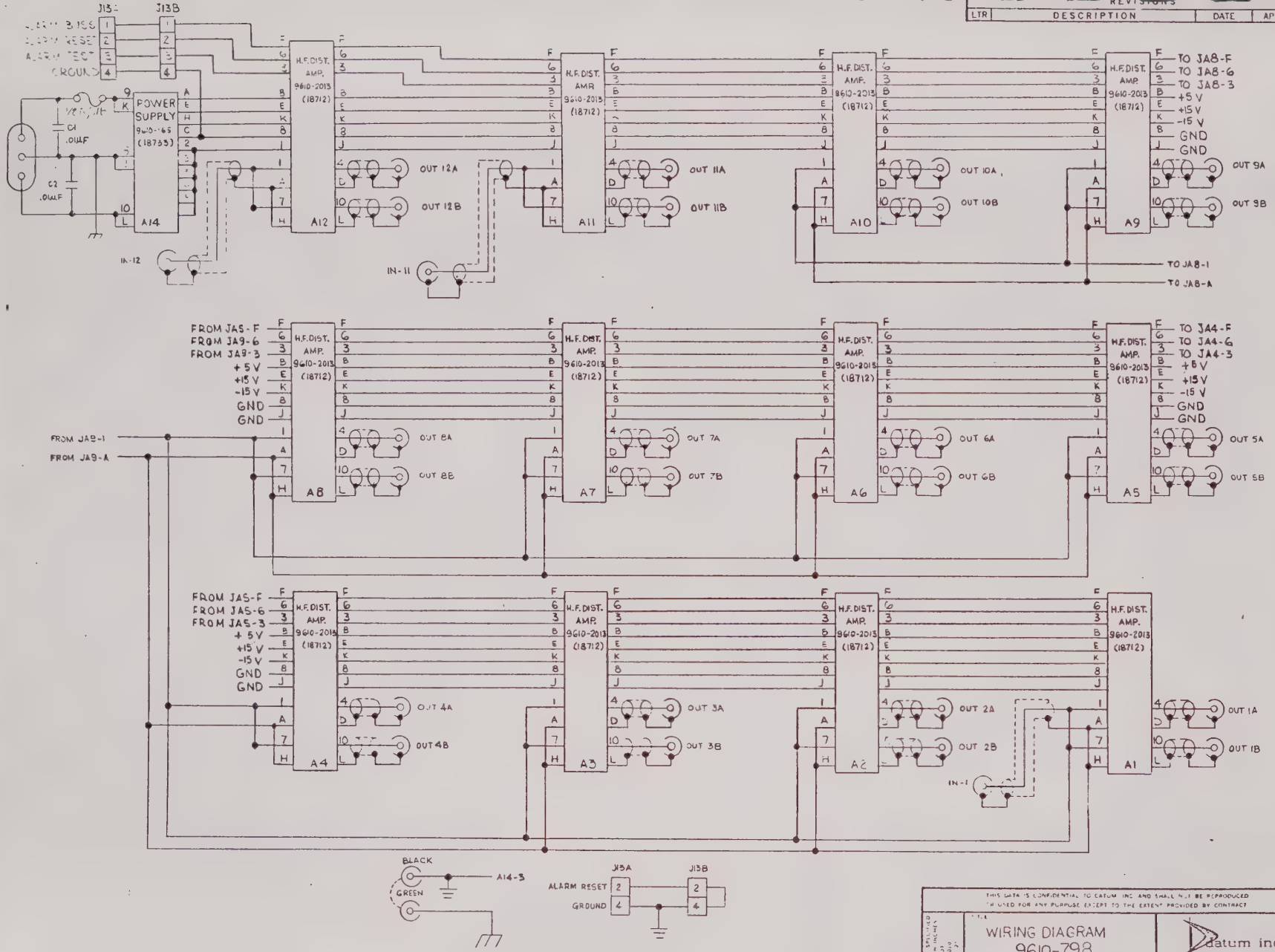
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOL .XX ±.03
.XXX ±.010
ANGLES ±1/2°

TITLE
DUAL
H.F. DISTRIBUTION
AMPLIFIER

DWN TERI	3/30/82	DES			
CHK		ENGR W	1/83	A	9610-2013
SCALE NONE		FSC 31160		SIZE	SHT 1 OF 1 REV

datum inc.
1363 S. STATE COLLEGE BLVD.
ANAHEIM, CALIFORNIA 92806



NOTES UNLESS OTHERWISE SPECIFIED

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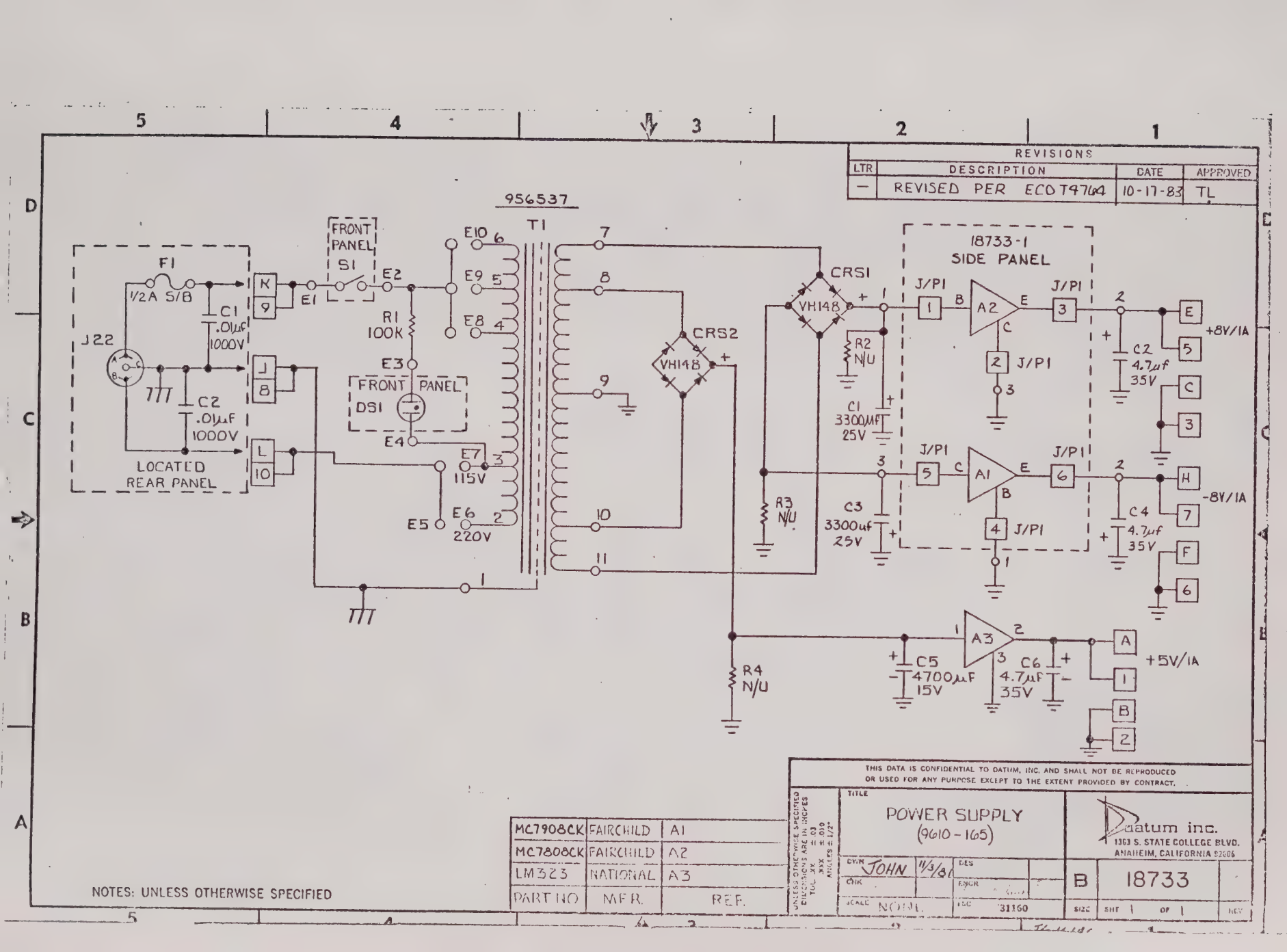
TITLE
WIRING DIAGRAM
9610-798

DWN PHAT LUONG 11/1/84
CHK
ENGR 11/24/84
SCALE NONE
FSC 31160

datum inc.
1363 S. STATE COLLEGE BLVD
ANAHEIM, CALIFORNIA 92806

C 9610-8132

SIZE SHT 1 OF 1 REV



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
—	REVISED PER ECO T4764	10-17-83	TL

PART NO	MFR.	REF.
MC7908CK	FAIRCHILD	A1
MC7808CK	FAIRCHILD	A2
LM323	NATIONAL	A3

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: XX ± .03 XXX ± .010 ANGLES ± 1/2°

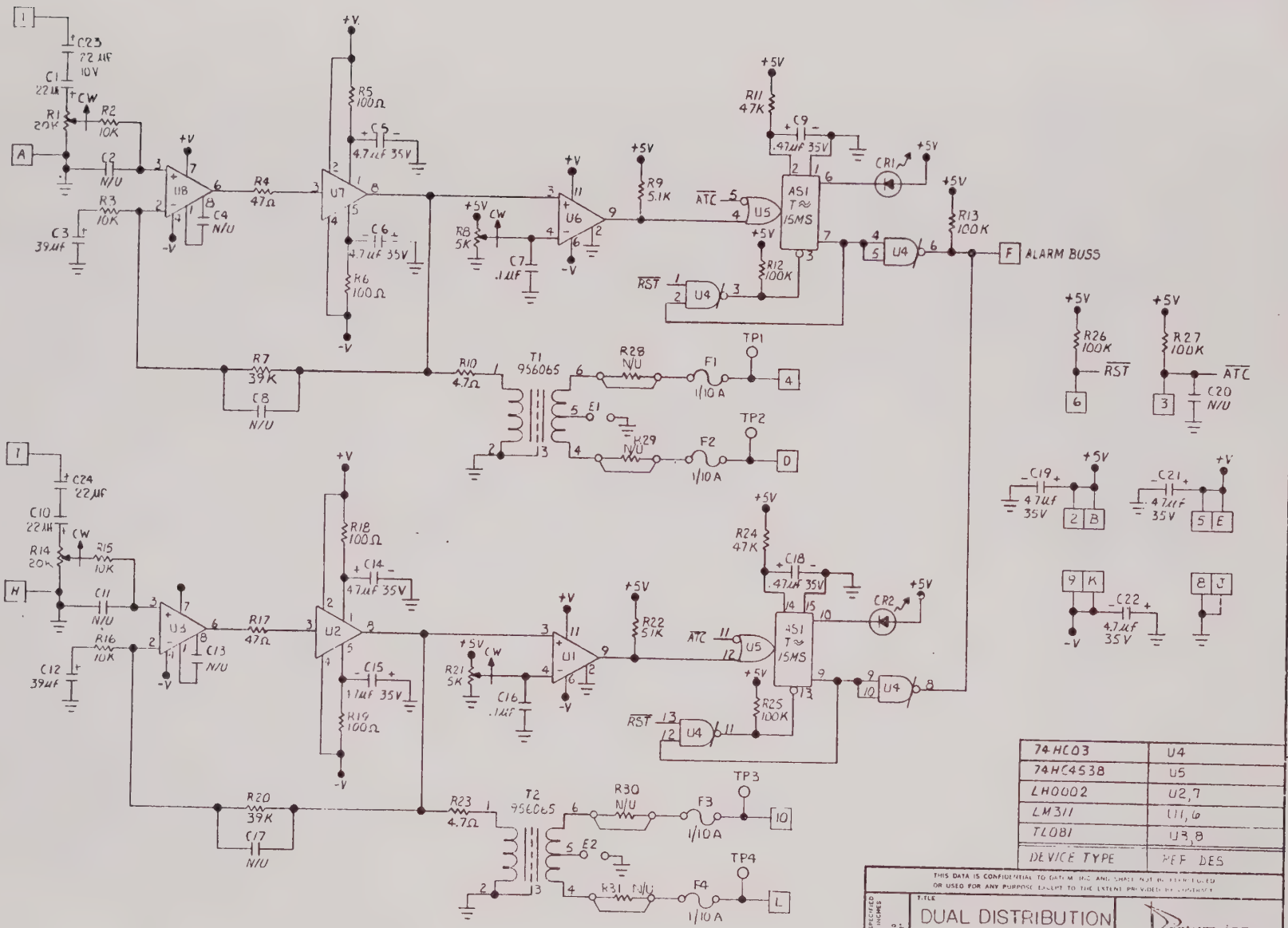
TITLE: POWER SUPPLY (9610-165)

DWN JOHN 11/3/83 | DES | CHK | ENGR | SCALE NONE | DSC 31160

Datum inc.
1363 S. STATE COLLEGE BLVD.
ANAHEIM, CALIFORNIA 92806

B | 18733 | SIZE | SHT 1 OF 1 | REV

A	REDRAWN PER ECO T4835	2-3-84	EH
B	ADDED C23 & C24	3-1-84	TL



74HC03	U4
74HC4538	U5
LH0002	U2,7
LM311	U1,6
TL081	U3,8
DEVICE TYPE	REF DES

1. NORMAL OPERATING VOLTAGE FOR +V AND -V ARE FROM 5 TO 18 VOLTS.

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOL: XX ± 0.03 ANGLES ± 1/2°

TITLE: DUAL DISTRIBUTION AMPLIFIER

DWN ESTHER 2/24 DES

CHK ENGR

SCALE NONE PO 31160

datum inc. 1363 S STATE COLLEGE BLVD ANAHEIM CALIFORNIA 92806

C 18712 B

SHT 1 OF 1 REV

TIF 11/20

SECTION VI
MATERIALS LISTS

The materials lists enumerated in the Table of Contents can be found on the following pages.

DATE: 10-4-84
DRAWN: QYE
CHK:

MATERIAL LIST

datum inc.

JOB NO:
QUANTITY
REV

TITLE: TIMING TERMINAL UNIT

ASS'Y NO: 9610-798
SHT 1 OF 1

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
1	9610-140-1	CHASSIS ASSY STK	DATUM	1			
2	- -165	POWER SUPPLY (18733)	-	1			
3	- -2012	MF DIST AMP (18711)	-	5			
4	- -2013	HF - - (18712)	-	7			
5	SH9610-798	SHIPPING KIT	-	1			
6							
7	1702-0020	CONNECTOR 20P	-	13			
8	1704-1002	- BNC	-	27			
9	- -1625-42	- 4P	-	2			
10	1706-1000	BINDING POST	-	1			
11	1792-1855	CONTACT SOCKET	-	8			
12	1795-0001	WASHER	-	27			
13	- -0002	-	-	27			
14	2325-2007	FASTENER	-	2			
15							
16	705879	REAR PANEL	-	1			
17							
18	DF30GNC	BINDING POST	SUPERIOR	1			
19							
20	938-L	SHORTING LINK	GENERAL RADIO	1			

NOTES:

BISHOP GRAPHICS/ACCUPRESS
REORDER NO A19508

DATE: 5-17-82
DRAWN: GME
CHK:

MATERIAL LIST

datum inc.

JOB NO:
QUANTITY
TITLE: POWER SUPPLY
ASS'Y NO: 9610-165
SHT 1 OF 1

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
1	18733	POWER SUPPLY	DATUM	1			

NOTES:

© BISHOP GRAPHICS/ACCUPRESS

DATE: 5-17-82

DRAWN: DH

CHK: _____

MATERIAL LIST

datum inc.

JOB NO: _____

QUANTITY _____

REV

TITLE: H.E DISTRIBUTION AMP

ASS'Y NO: 9610-2013

SHT 1 OF 1

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.				REF. DES.	UNIT COST	LOT TOTAL	
1	18712	H.E DIST AMP	DATUM	1							

NOTES:

BISHOP GRAPHICS/ACCUPRESS
RECORDER NO A 1251

DATE: 10-08-81
DRAWN: RAE
CHK:

MATERIAL LIST

datum inc.

JOB NO:
QUANTITY
REV

TITLE: POWER SUPPLY

ASS'Y NO: 18733

SHT 1 OF 2

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
1	0102-0104	RESISTOR 100K 1/4W 5%	DATUM	1	R1		
2							
3	0219-0478	CAPACITOR 4700MF 16V	-	1	C5		
4	0220-0475	4.7MF 35V	-	3	C2,4,6		
5							
6							
7							
8	0301-9323-K	- LM323K	-	1	A3		
9							
10	0540-0148	BRIDGE RECT VH14B	-	2	CR1,2		
11							
12	1202-0102	SWITCH SPDT	-	1			
13	1704-1625-6R	CONNECTOR 6P	-	1			
14	1708-4602	SOCKET	-	1			
15	1792-1561	CONTACT SOCKET	-	6			
16	2107-0001	LAMP	-	1			
17	2310-4003	STANDOFF 4-40X 7/16	-	2			
18	- -4004	- - X 1/2	-	2			
19	2325-2007	FASTENER	-	2			
20	18733-1	PWR SUPPLY (REGULATOR)	-	1			
21	171322A	PC BOARD	-	1			
22							
23	703098	FRONT PANEL STM	-	1			
24	703099	COVER PLATE STM	-	1			
25	705772	PLATE	-	1			
26							

NOTES:

BISHOP GRAPHICS/ACCUPRESS
BORDER NO. A 2R1

DATE: 10-08-81
DRAWN: RHE
CHK:

MATERIAL LIST

Ddatum inc.

JOB NO:
QUANTITY
REV

TITLE: POWER SUPPLY

ASS'Y NO: 18733

SHT 2 OF 2

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
27	956537	TRANSFORMER	DATUM	1	T1		
28							
29	338RMR025M	CAPACITOR 3300MF 25V	ILL CAP	2	C1,3		
30							
31	LAT03B4CB	HEAT SINK	IERC	1			

NOTES:

BISHOP GRAPHICS/ACCUPRESS

DATE: 1-24-84
DRAWN: TEEI
CHK:

MATERIAL LIST

datum inc.

JOB NO:
QUANTITY
REV: B

TITLE: DISTRIBUTION AMPLIFIER
ASS'Y NO: 18712
SHT 1 OF 2

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
1	0102-0470	RESISTOR 47Ω, ¼W, 5%	DATUM	2	R4, 17		
2	" -04R7	" 4.7Ω " "	"	2	R10, 23		
3	" -0101	" 100Ω " "	"	4	R5, 6, 18, 19		
4	" -0512	" 5.1K " "	"	2	R9, 22		
5	" -0103	" 10K " "	"	4	R2, 3, 15, 16		
6	" -0473	" 47K " "	"	2	R11, 24		
7	" -0104	" 100K " "	"	5	R12, 13, 25, 26, 27		
8	" -0393	" 39K " "	"	2	R7, 20		
9	0153-5001	RESISTOR POT 5K	"	2	R8, 21		
10	0153-2002	" " 20K	"	2	R1, 14		
11							
12	0220-0474	CAPACITOR .47μf 35V	"	2	C9, 18		
13	" -0475	" 4.7μf 35V	"	7	C5, 6, 14, 15, 19, 21, 22		
14	" -0396	" 39μf 10V	"	2	C3, 12		
15	0226-0104.2	" .1μf 25V	"	2	C7, 16		
16	0220-0226	" 22μf 10V	"	4	C1, 10, 23, 24		
17							
18	0301-HC03	IC 74HC03	"	1	U4		
19	" -HC45-38	" 74HC4538	"	1	U5		
20	" -NH02	" LH0002CN	"	2	U2, 7		
21	" -9311	" LM311N	"	2	U1, 6		
22							
23	2204-3600	LED RED	"	2	CR1, 2		
24	9560065	TRANSFORMER	"	2	T1, 2		
25	TL081CP	IC	TI	2	U3, 8		
26							

NOTES: JUMPER ACROSS R28-R31

DATE: 1-27-84

DRAWN: TSRI

CHK:

MATERIAL LIST

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JOB NO:

QUANTITY

REV B

TITLE: HF DUAL DISTRIBUTION AMPLIFIER

ASS'Y NO: 18712

SHT 2 OF 2

ITEM	STOCK/PART NO.	DESCRIPTION	MFR/SPEC	QTY.	REF. DES.	UNIT COST	LOT TOTAL
27	0703-0010	FUSE 1/10 A	DATUM	4	F1-F4		
28							
29	1706-1447-1	BUSHING WHT	"	4			
30	" -3002	TEST POINT RED	"	4	TP1-TP4		
31	1708-3270-1	SOCKET, COMP LEAD	"	8			
32							
33	2325-2007	FASTENER	"	2			
34							
35	708936	PANEL	"	1			
36	708935	COVER PLATE	"	1			
37							
38	171887 A	PC. BOARD	"	1			

NOTES:

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